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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,275	12/02/2003	Haruki Ito	9319S-000589	3383
27572	7590	12/13/2005	EXAMINER	
HARNESSE, DICKEY & PIERCE, P.L.C.			PHAM, THANHHA S	
P.O. BOX 828			ART UNIT	
BLOOMFIELD HILLS, MI 48303			PAPER NUMBER	
			2813	

DATE MAILED: 12/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/726,275

Applicant(s)

ITO, HARUKI

Examiner

Thanhha Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>09/15/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to Applicant's Amendment dated 08/25/2005.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the first conductive layer covering the electrodes before the resin is formed must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

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the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 1 objected to because of informalities. Appropriate corrections are required to clarify scope of claim.

► With respect to claim 1,

line 8, "the element" lacking antecedent basis should be changed to "the semiconductor element"

line 9, "a height of the layer" should be changed to "a height of the layer of resin"

3. Claim 5 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

► With respect to claim 5, it is not clear how the step of forming the conductive layer over the plurality of electrodes and the layer of resin can comprise forming a first conductive layer that covers the electrodes **before the layer of resin is formed**. The step "**forming a first conductive layer** that covers the electrodes **before the layer of resin is formed**" does not further limit the subject matter of the independent claim of the step "**forming the conductive layer over** the plurality of electrodes and **the layer of resin**". It is not clear how a **first conductive layer** can be a part of "the conductive

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layer **over ...the layer of resin**" while the first conductive layer is formed before forming the layer of resin. In addition, in the step of patterning the conductive layer on the electrodes and the layer of resin as cited in claim 1, it is not clear that whether or not the first conductive layer is also patterned or not.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Takashi Okano [JP 04030533].

► With respect to claim 1, Takashi Okano (figs 3's, whole translated document) discloses the claimed method for manufacturing a semiconductor device comprising:

forming a plurality of electrodes (3, fig 3a) on a semiconductor element;

applying a layer of a resin (6, fig 3c: *polyimide layer 6 is the layer of resin*) to the semiconductor element in a region of the semiconductor element that does not include the electrodes, the layer of resin being applied such that a height of the layer of the resin is greater than a height of the electrodes;

forming a conductive layer (7/8, fig 3d-3e) over the plurality of electrodes (3) and the layer of resin (6);

patterning the conductive layer (7/8, figs 3e-3f) on the electrodes and the layer of resin in a predetermined pattern; and

removing portions of the layer of resin (6) by using the patterned conductive layer (7/8, fig 3f) as a mask so that remaining portions of the layer of resin form a plurality of protrusion.

- ▶ With respect to claim 2, Takashi Okano (translated document, page 10) shows the layer of resin (6) is removed by plasma processing.
- ▶ With respect to claim 3 and 4, Takashi Okano (translated document, page 10) shows the conductive layer (7/8) is formed by sputtering and plating.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time it was made. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takashi Okano [JP 04030533] in view of Mukai et al [JP 56164556].

Takashi Okano (fig 2, whole document) discloses a method for manufacturing semiconductor device comprising:

forming a plurality of electrodes (3, fig 3a) on a semiconductor element;

applying a layer of a resin (6, fig 3c: *polyimide layer 6 is the layer of resin*) to the semiconductor element in a region of the semiconductor element that does not include

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the electrodes, the layer of resin being applied such that a height of the layer of the resin is greater than a height of the electrodes;

forming a first conductive layer (7, fig 3d) that cover the electrodes (3)

forming a second conductive layer (8, fig 3d-3e) over the plurality of electrodes (3) and the layer of resin (6) after the layer of resin is applied, the second conductive layer being connected to the first conductive layer and covering a top surface of the layer of resin;

patterning the second conductive layer (8, figs 3e-3f) on the electrodes and the layer of resin in a predetermined pattern; and

removing portions of the layer of resin (6) by using the patterned second conductive layer (7/8, fig 3f) as a mask so that remaining portions of the layer of resin form a plurality of protrusion.

Takashi Okano does not teach forming said first conductive layer (barrier layer 7) before the layer of resin is formed. Instead, Takashi Okano forms the first conductive layer (barrier layer 7) after forming the layer of resin (6).

However, Mukai et al (figs 2-3's, whole document) shows the first conductive barrier layer (5/6, fig 3's) should be formed before forming the layer of resin (8) to provide a better device with improve adhesiveness of electrode and crack prevention.

Therefore, at the time of invention, it would have been obvious for those skilled in the art to modify process of Takashi Okano by forming the first conductive layer before forming the layer of resin to provide a better device with improved interconnection with reason given above.

Allowable Subject Matter

6. Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter: Recorded Prior Art fails to disclose or suggest combination of process steps for manufacturing a semiconductor device comprising: forming a first conductive layer that covers the electrodes before a layer of resin is formed wherein the first conductive layer is formed by electroless nickel plating; forming said layer of resin to the semiconductor device element in a region of the semiconductor element that does not include the electrodes, the layer of resin being applied such that a height of the layer of resin is greater than a height of the electrodes; forming a second conductive layer over the plurality of electrodes and the layer of resin after the layer of resin is applied, the second conductive layer being connected to the first conductive layer and covering a top surface of the layer of resin; patterning the second conductive layer on the electrodes and the layer of resin in a predetermined pattern; and removing portions of the layer of resin by using the patterned second conductive layer as a mask so that remaining portions of the layer of resin form a plurality of protrusion.

Response to Arguments

8. Applicant's arguments with respect to claims 1-5 have been considered but are moot in view of the new ground(s) of rejection.

9. Applicant's arguments with respect to drawing objection filed on 08/25/2005 have been fully considered but they are not persuasive. Applicant argues that objection to the drawing should be withdrawn since conductive layer 5 of figure 3 includes both of first conductive layer and the second conductive layer because the claimed first and second conductive layers form the single conductive layer 5. The argument is not persuasive because the objection to the claim as being mentioned above. The drawing should show the first conductive layer being formed before forming the layer of resin (4). The conductive layer 5 of figure 3 being formed on the electrodes (2) and the layer of resin (4) can only be considered as the second conductive layer – after the layer of resin being formed. Correction to the drawing is respectfully requested.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to be 'Thanhha Pham', written over a horizontal line.

Thanhha Pham